~~FIGS. 3, 4A, and 4B show a first embodiment~~ of a ~~microfabricated fluidic pressure~~ amplifier (or pressure ~~multiplier) of the present invention;~~

FIG. 4C is a symbol for a pressure multiplier;

FIGS. 5A-5B and 6 show a first embodiment of a microfabricated fluidic switch;

FIGS. 7A-7E show a second embodiment of a microfabricated fluidic switch;

FIG. 8 shows a third embodiment of a microfabricated fluidic switch;

FIGS. 9A-9D show an embodiment of a microfabricated fluidic switch that is normally closed, but opens when the pressure in the gate is increased;

FIG. 10 illustrates a microfabricated fluidic switch comprising a pressure multiplier and a valve;

FIGS. 11A-11K show symbols representing microfabricated fluidic devices;

FIG. 12A shows an example of an inverter formed with microfabricated fluidic devices;

FIG. 12B shows the symbol for an inverter;

FIG. 12C shows an example of an OR logic gate formed with microfabricated fluidic devices;

FIG. 12D shows the symbol for an OR gate;

FIG. 12E is an example of a NOR logic gate formed with microfabricated fluidic devices;

FIG. 12F shows the symbol for a two input NOR gate;

FIG. 12G shows an example of an AND logic gate formed with microfabricated fluidic devices;

FIG. 12H shows the symbol for a two input AND gate;

FIG. 12I shows an example of a NAND logic gate formed with microfabricated fluidic switches;

FIG. 12J shows the symbol for a two input NAND gate;

FIG. 13 is one example of an S-R flip-flop that is constructed with two cross-coupled NAND gates;

FIG. 14A shows an example of a S-R flip-flop of the present invention constructed with microfabricated fluidic cross-coupled NAND gates;

FIG. 14B shows another example of an S-R flip-flop of the present invention comprising microfabricated microfluidic devices;

FIGS. 15A-15J are valves that may be used as vacuum actuated normally closed switches when its input channel is coupled to a pressure amplifier;

FIG. 16 shows a previously known macroscopic high pressure source;

FIGS. 17A-17B show an example of a microfabricated fluidic pump;

FIG. 18 shows the symbol for a unidirectional valve in microfluidics;

FIG. 19 shows a previously known macroscopic unidirectional valve;

FIG. 20A is an embodiment of a unidirectional valve that can be made on a microfluidic chip;

FIG. 20B shows a cross sectional view of channel 453;

FIG. 21 is another embodiment of a microfluidic unidirectional value of the present invention that can be made on a microfluidic chip;

FIG. 22 shows another embodiment of a microfluidic unidirectional valve of the present invention;

FIG. 23 shows a unidirectional active valve that may be constructed by using a pair of normally open switches;

FIG. 24 shows an embodiment of a microfluidic high pressure reservoir that can be formed on a microfluidic chip;

FIG. 25A shows the symbol for a microfluidic pump;

FIG. 25B shows the symbol for a microfluidic high pressure reservoir;

FIG. 26 shows a schematic for a microfabricated fluidic device that provides a high pressure source for microfluidic applications of the present invention;

FIG. 27 shows a microfluidic generator;

FIG. 28 shows a microfluidic capacitor that may be manufactured on a microfluidic chip;

FIG. 29A shows a cross section view of layer 608;

FIG. 29B shows a cross section view of layer 607;

FIG. 30 shows the schematic for an embodiment of a vacuum pressure source;

FIG. 31 shows a unidirectional valve;

FIG. 32 shows an example of a microfluidic vacuum reservoir;

FIG. 33 is a flip-flop that includes cross-coupled microfluidic NOR gates;

FIG. 34 shows a microfluidic switching regulator;

FIG. 35A shows a symbol for an pressure step source;

FIG. 35B shows a top graph of the current I through the sodium chloride solution in the channel and a bottom graph of the increase in pressure P at output terminal OUT;

FIG. 36A shows a first embodiment of a microfluidic S-R flip-flop that is coupled to a pair of pressure step sources;

FIG. 36B shows pressure graphs for FIG. 36A;

FIG. 37A shows a further embodiment of the present invention that provides a way to rapidly open and close a valve or a switch using a single step pressure source with appropriate delay logic;

FIG. 37B shows pressure graphs for FIG. 37A;

FIG. 38 shows a device for sections of the microfluidic logic which operate synchronously;

FIGS. 39A-39D show another microfluidic switch of the present invention; and

FIGS. 40-41 are other inverted pyramid pressure amplification switches.